DETERMINANTS OF FINANCIAL PERFORMANCE OF INSURANCE COMPANIES AND TAKAFUL OPERATORS IN MALAYSIA: A COMPARATIVE STUDY

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ABSTRACT

The insurance and takaful sector is one of the fundamental elements in the financing of the Malaysia economy and contributes to the effort to support the development of the countries. In this study, we examine the impact of firm specific factors (underwriting risk, size and expense ratio) and macroeconomic factors (GDP, BLR and TBR) on the performance of eight (8) insurance companies and eight (8) takaful operators in Malaysia over a period of eight (8) years (2011-2018). Secondary data that was collected from the financial statements (balance sheet and income statements) of insurance companies and takaful operators; and statistics report from Bank Negara Malaysia (BNM) are the major sources of data for this study. The results from panel data indicates that the variables underwriting risk, size, GDP and TBR are the most important determinants of the financial performance of takaful operators measured by ROA (Return on Assets) and ROE (Return on Equity). However, the financial performance of insurance companies is statistically significant with variables size, expense ratio, GDP and BLR, determines the performance of insurance companies measured by ROE. As for ROA only expense ratio is significant.

Keywords: Insurance, Takaful, financial performance, underwriting risk

ABSTRAK

Sektor insurans dan takaful adalah elemen utama dalam aspek kewangan ekonomi dan membantu dalam pembangunan negara Malaysia. Kajian ini bertujuan untuk menilai apakah kesan faktor khusus firma (risiko pengunderaitan, saiz dan nisbah perbelanjaan) serta faktor makroekonomi (GDP, BLR dan TBR) terhadap prestasi lapan (8) syarikat insurans dan lapan (8) pengendali takaful di Malaysia dalam tempoh lapan (8) tahun (2011-2018). Data sekunder yang diperolehi daripada penyata kewangan (kunci kira-kira dan penyata pendapatan) syarikat insurans dan pengendali takaful; serta laporan statistik daripada Bank Negara Malaysia (BNM) adalah sumber data utama bagi kajian ini. Keputusan daripada data panel membuktikan bahawa faktor risiko pengunderaitan, saiz, GDP dan TBR adalah faktor utama yang menyumbang kepada prestasi kewangan pengendali takaful yang dinilai daripada ROA (pulangan aset) dan ROE (pulangan ekuiti). Sebaliknya bagi prestasi kewangan syarikat insurans secara statistiknya faktor terpenting adalah saiz, nisbah perbelanjaan, GDP dan BLR yang menentukan tahap prestasi kewangan syarikat insurans yang dinilai daripada aspek ROE manakala hanya nisbah perbelanjaan faktor terpenting bagi ROA.

Kata kunci: Insurans, Takaful, prestasi kewangan, risiko pengunderaitan

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ASEAN	Association of Southeast Asian Nations
BLR	Based Lending Rate
BNM	Bank Negara Malaysia
BSC	Balanced Scorecard
ETA	Expense Ratio
GDP	Gross Domestic Product
KSA	Kingdom of Saudi Arabia
LIAM	Life Insurance Association Malaysia
MENA	Middle East and North Africa
MIFC	Malaysia International Islamic Financial Centre
MTA	Malaysian Takaful Associations
NCR	Underwriting Risk
PIAM	Persatuan Insurans Am Malaysia
RBC	Risk Based Capital
RBV	Resource Based View
ROA	Return on Assets
ROE	Return on Equity
SIZE	Natural log of total assets
TBR	Treasury Bills Rate
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Analysis of this research paper to study the determinants of financial performance of insurance companies and takaful operators in Malaysia. This section involves the background of the study, problem statement, research questions, research objectives, scope and limitation of the study and organization of the study.

1.1 Background of the study

Malaysian economy grew 5.9 percent in the year 2017 showcasing its resilience and overcoming market expectations of slower growth. In 2017, headline inflation stood at 3.7 percent for the full year higher than the 2.6 percent in 2016. The past decade has seen the rapid development of services sector remained strong with the finance and insurance sector increasing by 5.8 percent contributed by a strong 7.9 percent growth in the combined insurance subsector general, life and takaful (PIAM, 2017).

For the fifth consecutive year, Thomson Reuters' Islamic Finance Development Indicator (IFDI) 2017 recognized Malaysia as the world's most advanced Islamic finance market. Malaysia was also ranked first in the 2017 Islamic Finance Country Index, which evaluated the global status of Islamic finance governance. The increasing demand for

Islamic finance, combined with numerous projects conducted by several governments and regulatory bodies across Asia, has fuelled the industry's development. Malaysia International Islamic Financial Centre (MIFC) revealed that Islamic finance assets are estimated to be worth exceeding USD1 trillion by 2023. With total Islamic financial assets recording an annual growth of 8.4 percent between 2011 and 2016, the Islamic financial sector in Asia has risen from strength to strength. In the Islamic financial system, Asia plays an important role. The Islamic economic assets of the region as at the end of 2017 amounted to USD528.7 billion or 26 percent of the world's economic resources and aligned with *Shariah* practices (MIFC, 2018).

Table 1.1
Overview of Malaysia's Islamic Financial Assets

Malaysia's Islamic Financial Assets 2017	
Total Islamic Banking Assets	USD204.4 billion
Total Sukuk Outstanding	USD202.2 billion
Islamic Asset Under Management	USD28.3 billion
Takaful Net Contribution	USD2.1 billion

Source: www.mifc.com

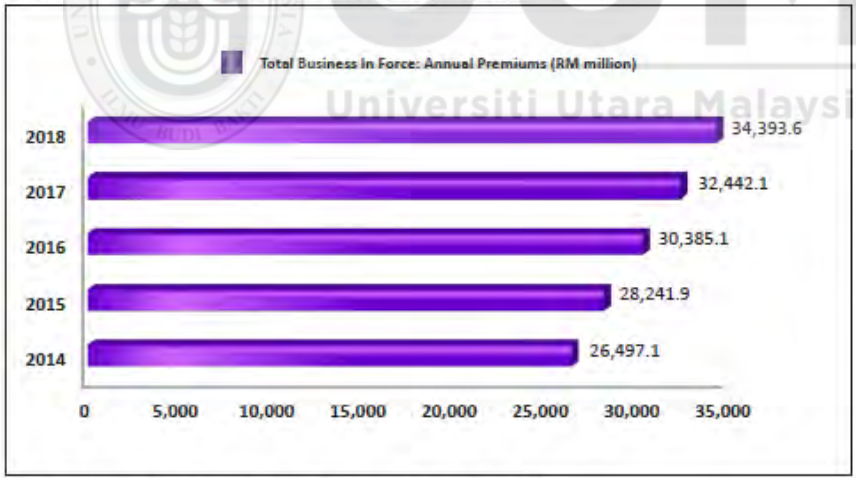
The Risk-based Capital (RBC) framework for Takaful operators sets the expectation of Bank Negara Malaysia (BNM) that the capital adequacy level of the licensed takaful operator will be maintained in line with the risk profile of the takaful operations and will act as a financial buffer for the takaful exposure. This structure seeks to accomplish the

following goals: (a) allow all commitments under a takaful agreement to be fulfilled; (b) provide flexibility for a certified takaful operator to function at distinct rates of risk in line with its business strategies as long as it maintains adequate capital levels and observes prudential safeguards; and (c) guarantee the growth of a powerful takaful sector in line with its business strategies (BNM, Risk-Based Capital Framework for Takaful Operators, 31 May 2017).

In 2017, the life insurance industry remains with an upward trend with greater insurance coverage for Malaysians, offering insurance coverage for all policies amounting to RM1.38 trillion (LIAM, 2017). ASEAN's total gross written premiums raised by 6.5 percent to USD86.6 billion, and the general insurance penetration rate rose by 10 basis points from 2.8 percent in 2016 to 2.9 percent in 2017. With insurance premium contributions of 29 percent, 28 percent and 22 percent respectively, Thailand, Singapore and Indonesia have the most advanced insurance markets in the area. The ASEAN life insurance industry reported a 9.3 percent rise in net written premiums in 2017 to USD 64.4 billion, with Singapore (21%), Thailand (18.1%) and Indonesia (14.4%) being the top contributors. The general insurance industry also recorded important development with a 5.3 percent rise in gross written premiums, led by Thailand (30%), Indonesia (21.2%) and Malaysia (18.4%) as top contributors (ASEAN Insurance Statistical Report, 2017).

The outlook and prospect of the life insurance sector remains positive as the percentage of population with life insurance or takaful plans is still low at 54 percent. Taking into account policyholders with more than one life or takaful policy/certificate, only 34 out of 100 people are insured. In response to this challenge, BNM together with Life Insurance Association Malaysia (LIAM), the Malaysian Takaful Association (MTA) and Persatuan Insurans Am Malaysia (PIAM) came up with a bold and noble initiative in November 2017 to launch an affordable insurance scheme "Perlindungan Tenang – Mampu & Mudah". Malaysians can now protect themselves and families (against key risks in life) with premiums/contributions from only a few ringgit per month (LIAM, 2017).

Table 1.2
Total business in force: Annual premiums



Source: LIAM Annual Report 2018

Effective January 2018, the Balanced Scorecard (BSC) for agents was introduced. Under the BSC framework, a proportion of agents remuneration will be dependent on a number of factors such as persistency, professionalism, advice given to customers, good service etc. This will be a major transformation to the life insurance experience for policyholders (LIAM, Annual Report, 2017)

The life insurance industry recorded a moderate growth in insurance coverage among Malaysians in 2018, registering a total of RM1.51 trillion in sum assured for all policies combined. This registered an increase of 9.6% as compared with the corresponding figure of RM1.38 trillion in 2017 (LIAM, 2018).

The life insurance industry has made significant progress in the migration to electronic payments (e-payment). As at end-December 2018, payments made by insurers via e-payment constituted 91 percent of the total volume of transactions and 87 percent of premiums received by insurers were through e-payment. LIAM will continue to work very closely with its member companies and BNM and continue to highlight the benefits of e-payment to their customers to further accelerate the industry's digital migration. As the industry evolves, they will continue to venture into new platforms, using new technologies to create innovative products, streamline processes, enhance efficiency and lowering costs to stay competitive and connected with consumers (LIAM, 2019).

1.2 Problem Statement

Profitability is one of the most significant goals of financial management to maximize the assets of the owner and very significant determinants of the results of the business (Ngoyen, 2006). Malik (2011) has analyzed Pakistan's insurance sector during 2005-2009, and Pakistan's annual insurance corporate accounts demonstrate big changes in revenues. This variation of earnings among insurance companies indicates that the firms specific variables are a key role in affecting the profitability of insurance businesses. Identifying what these variables are and how it enables insurance companies and takaful operators in Malaysia is therefore a very important aspect that needs to take action that will ultimately boost the profitability of businesses and investors to forecast the profitability of insurance companies and takaful operators in Malaysia.

The most significant instrument used by actuaries in a company's economic assessment is the decision-making method on insurance firms and takaful operators are underwriting and investment operations. Macroeconomic context also important in insurance companies and takaful operators financial performance as the insurance and takaful sector is one of the elements of the financial system, fostering economic growth and market stability. The underwriting risk goal focuses on the effectiveness of the underwriting operation of the insurer and takaful and is assessed by the rate of loss, which is calculated as a proportion of gross claims to gross written premiums. Gross written premium growth is anticipated to have a beneficial impact on economic results

due to enhanced underwriting activity and extension of market share (Burca & Batrinca,2014).

Underwriting risk is one of the factors that arise from insurance policies to ensure that claims able to be paid. Any insurance policy's risk is the occurrence of an insured situation and the uncertainty about the amount of losses that result from the unfortunate events. Underwriting risk is related to the possibility that could happen if actual claims and compensation exceed the net book value of insurance liability due to accidents, errors and/or changes in circumstances. This includes the risk of determining the premium (pricing risk), fund risk (reserve risk), reinsurance risk, and occurance risk.

The insurance companies are highly exposed to a number of risks insured that are transferred to them when insurance contract are in force. One of the underwriting risks which is present at the time the policy is issued and before the insured event occurs is pricing risk. That is a risk that the costs and claims will be higher than the premiums received. When calculating the sufficient premium it may happen that the calculated premium is insufficient for the underwritten risks. It is this risk, the risk that the insurer will not raise sufficient revenues from premiums to cover claims or sum insured. If the contracted premium is undervalued, it means that at the time of claims liquidation paid premiums will be lower, and the insurer will face a loss on a particular insured event. The other extreme is overrated premium, and also the risk whereupon the insured pays a higher price than the actual value. In this case, the insurance company is uncompetitive

in the market due to excessive premiums thereby reducing portfolio and the number of insured. Pricing risk may be primarily generated from the inadequacy of the premiums in the form of underestimation of the premiums or insufficient diversification of insurance portfolio (Jakovčević & Žaja, 2014).

Insurers and takaful operators that undertake business with high risk need to diversify their risk with a diligent underwriting risks that helps to reduce exposure to underwriting losses and improve overrall operational profits. To increase financial performance, insurers and takaful operators have to anticipated lower losses to reduce the monitoring and claims handling costs. With the higher underwriting risk will leads to the increasing of operating ratio. This indicate adverse effect on the firm's financial performance. This research suggested that insurers and takaful operators undertake underwriting risk (e.g. the risk of catastrophe that leads to fundamental risk), need to maintain good management guidelines to reduce their risk exposure prior underwriting process and maximize their return on investment after underwriting (Lee,2014).

1.2.1 Conceptual and structural differences between Insurance and Takaful

Insurer undertakes risk with condition of premium paying to compensate with claim. Claim payment made to insure or the policyholder due to specific event such as death, disability or critical disease happens. Takaful, on the other hand, is an Islamic solution to conventional insurance methods based on the notion of risk sharing and the principle of 'social solidarity, collaboration and joint compensation of members' losses. On the other hand, it is generally considered that buying and selling agreement or best known as insurance risk transfer is structurally contrary to *Shariah* principles. By avoiding risk, it is contrary with Allah fate, as Muslims we have to believe that His will predetermines what happens. Hence, we are encouraged to take steps in mitigating the impact of unfortunate events such as accident, disability and illness.

In conventional mainstream insurance, what would be the specifically objectionable argument? It is undeniable where uncertainty and ambiguity existed; it involves *Riba* (forbidden interest), *Gharar* (excessive risk and inadequate transparency), *Maysir* (gambling) and investment in forbidden instruments that is non-shariah compliant such as the manufacturing of alcoholic beverages. Furthermore, conventional insurance is regarded *Haram* (forbidden) because of the business model of insurers which is payment made for an invaluable loss of human lives and with the intention to generate profit for the stakeholders. Based on the risk transfer concept and buy and sell agreement business model that defeat the purpose of securing advantages for the insured individual.

Takaful is a *Ta'awun* (mutual guarantee) agreement based on mutual assistance and *Tabarru'* (donation) in which participants in the takaful pool / contract willingly to take risks. It is interesting to examine on the basis of these distinctions whether there are variations in performance and economic strength between takaful operators and insurance companies in Malaysia (Abdou, 2014).

1.3 Research Questions

This study aims to answer the following research questions:

1) What is the level of financial performance between Insurance and Takaful industry in Malaysia over 2011-2018 study period?
2) Do underwriting risk, firm specific and macroeconomic factors affect the financial performances (ROA and ROE) of Malaysian insurance companies?
3) Do underwriting risk, firm specific and macroeconomic factors affect the financial performances (ROA and ROE) of Malaysian takaful operators?

1.4 Research Objectives

1.4.1 Main Objective

The main objective of this study is to assess the factors influencing financial performance of Insurance and Takaful industry in Malaysia.

1.4.2 Specific Objectives

The specific objectives of the study are:

1) To study the level of insurance companies and takaful operators performances in Malaysia over 2011-2018 study period.
2) To investigate the impact of underwriting risk, firm specific and macroeconomic factors affect the financial performances of Malaysian insurance companies.
3) To investigate the impact of underwriting risk, firm specific and macroeconomic factors affect the financial performances of Malaysian takaful operators.

1.5 Scope and Limitations of the Study

According to the latest records by BNM, a total of 14 insurance company (inclusive both life and general business) and 15 takaful operators (inclusive both family and general business) are still operating in Malaysia. This study was limited only to a total of eight (8) insurance companies and eight (8) takaful operators and selected based on their reputation and data accessibility. Data for this study is from the company's financial statements taken from the company's website for eight (8) years beginning from 2011 up to 2018. In addition, in connection with the RBC framework issued by BNM for takaful and insurance, BNM have indicated that the effective date of implementation was in 2014. Hence, data for this study is limited to eight (8) years only on the basis of all the information described above.

1.6 Organization of the Study

The study is divided into five chapters, namely chapter one begins by background of the study, problem statement, research questions, research objectives, scope and limitation of the study, and organization of the study. The second chapter is about literature review consists of introduction, underpinning theory, literature on performance of insurance and takaful, firm specific factors, macroeconomic factors and summary.

The study continued with the third chapter deals with research design and methodology. This chapter starts with introduction, research design, data collection procedures, conceptual framework, definition of variables, hypothesis development, panel regression model, data analysis and ending with summary. Chapter four is about results and discussion. This chapter will focus on the statistical analysis using descriptive statistics, multicollinearity test, diagnostic test, financial performance analysis, panel regression analysis and result summary. The result will be presented in table, figure and diagram for better illustration. The last chapter is the conclusion, starting with recapitulation of findings, contribution of the study, limitation and suggestions.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Most of research has studied financial performance related to banking industry but limited research related to financial performance of insurance industry (Burca & Batrinca, 2014). Among the pioneer research related to the financial performance of insurance industry is done by Spiller (1972), Chidambaram (1997), Cummins and Weiss (1998) and Genetay (1999).

This literature review been made to give more in-depth knowledge with regards to the research questions highlighted in the previous section. The study begins with underpinning theory continue with literature on performance of insurance and takaful, firm specific and macroeconomic factors and will be end with summary.

2.1 Underpinning Theory

The theory that highlighted in this research are Systems Theory and Resource Based View (RBV). Details discussion of both theory as per below :

2.1.1 Systems Theory

Kühn (1974) in his studies considered a system as "any pattern whose elements are related in sufficiently regular way to justify attention.". The goal of system theory and concentrate on phenomena and occurrences is a conceptual method of human interrelation and the related cognitive constructions in both culture and nature. It is a complex of interacting elements that allow the identification of a boundary-maintaining entity or process together with the interactions between them. According to Laszlo and Krippner (1998), "systems theory promises to offer a powerful conceptual approach for grasping the interrelation of human beings and the associated cognitive structures and processes specific to them in both society and nature." It is"concerned with the holistic and integrative exploration of phenomena and events." This system can be defined as "a set of interrelated and interdependent parts arranged in a manner that produces a united whole"(Nwachukwu, 2006).

2.1.2 Resource Based View (RBV)

Barney (1991) in his research highlighted that in order to explain the observed performance differences between companies, a small level of heterogeneity should definitely occur within distinct companies. If all companies have the same resources and implement the same strategies and are only able to improve their efficiency and effectiveness at the same level, there will be no sustained competitive advantage or

performance superiority. Competitive advantage on the assets of a company can be constructed on certain significant circumstances such as value, heterogeneity, uniqueness, durability, imperfect mobility, unsubstitutability, imperfect imitability and ex ante competition restrictions (Čater, 2001). RBV concerns on relationship between firms' internal resources and performance (Denizel & Özdemir, 2006).

2.2 Literature on Performance of Insurance and Takaful

According to Heikal, Khaddafi and Ummah (2014), financial performance is used to measure the efficiency of the company in generating profits through the use of the assets. This will helps to indicate the management level in managing the assets. A company with higher financial performance will able to gain investors confidences to invest that will leads in generating the company's profit.

Objectives of this study to identify variables that is directly attributable to the financial statements that are significance to the financial performance. Financial performance will be measured by Return on Assets (ROA) using profit after tax to total assets to determine on a financial institution capability in converting its assets into net earnings and Return on Equity (ROE) with the computation of profit after tax to equity capital, measures the net earnings per unit of investment committed by the shareholders. Financial position performance and company's management can be measured by the higher the ratios, reflects greater performance (Abdou, 2014).

2.2.1 Return on Assets (ROA)

Over the past decade most research on financial performance or profitability has emphasized the use of ROA. According to Burca and Batrînca (2014), Dupont in year 1919 has developed methods of quantifying financial performance using return on assets ratio which represents one of the most used in emphasizing the company's ability to efficiently use its assets.

Guendouz and Ouassaf (2018) in their study on six (6) largest Saudi Takaful Insurance companies for the period 2010-2016 have discovered that return on assets has significant effects on the profitability of takaful companies but there are no significant effects among insurance companies. This research supported by Kemal (2018), in analysis of life insurance companies in Pakistan for a period of 2006-2016.

2.2.2 Return on Equity (ROE)

Return on Equity (ROE) used to measure the insurance company's profitability by the amount of profit generated from the invested shareholders' money. The ratio is based on net income of a corporation during a period of one year over its shareholders' equity during the same period (Hidayat & Abdulla, 2011).

According to Akhtar (2018), technical efficiency of firms appears to be positively affecting and significantly coefficient by the profitability (ROE) and this is based on analysis of insurance companies in the Kingdom of Saudi Arabia (KSA) across

conventional versus Takaful-based firms over a period of six year from 2010-2015. This research also supported by the findings of Afza and Jam (2012) for the non-life insurance firms.

Based on results of the ROE, compared insurance industry and takaful industry, insurance industry has better financial performance and managerial efficiency (Abdou, 2014). This finding also discovered by Hidayat and Abdulla (2011) in their study during 2006 to 2011, they have discovered that in deploying shareholders' capital, the conventional insurance companies is more efficient.

2.3 Firm Specific Factors

Based on multicollinearity test, only three firm specific factors been selected which are underwriting risk measured by net claims incurred to net contributions (NCR), natural log of total assets (SIZE) and expenses to total assets (ETA). The descriptions and past studies of each factor are reviewed in subsection 2.3.1, 2.3.2 and 2.3.3.

2.3.1 Underwriting Risk (NCR)

Underwriting risk was recognized as one of insurance companies most significant performance criteria and expressed as a loss ratio to show the efficiency of insurance companies underwriting operations. In this research, underwriting risk (NCR) is calculated by separating the net claims arising from the net premiums / contributions

gained. All insurance companies will generally anticipate an increase in their premiums and reduce the claims they are required to offset.

According to Lee (2014), higher risk of underwriting will increase the percentage of operations and adversely affect the profitability of the company. This outcome indicates that if insurers undertake risk underwriting (e.g. catastrophe risk), they need to keep good management rules to decrease their risk exposure before accepting the risk and maximizing their return on investment. The empirical underpinning shows a significant and positive correlation between the underwiting risk and the operating ratio. An increase of underwriting risk raises the operating ratio that can adversely influence the profitability of the company. This shows that to accept risks as the management of non-life insurers, stronger rules must be followed to decrease exposure before any risk is accepted (Datu,2016).

Research conducted by Rahman and Daud (2010), which is takaful operators in Malaysia, appears to be conducting prudent underwriting, minimizing data asymmetry and leading to viable claims (Roger, 2014). Charumathi, (2012) discovered in his study there is positive relationship between the return on assets and the underwriting risk with Beta coefficient for this variable is positive but not significant. In contrast, the financial performance and underwriting risk of the insurer is found negative and the excessive risk of underwriting impacts the stability of the company through greater losses (Burca & Batrinca, 2014), (Öner Kaya, 2015), (Hailegebreal, 2016).

2.3.2 Natural Log of Total Assets (SIZE)

Many studies have been performed to determine variables that influence the profitability of insurance companies measured by the natural logarithm of total assets. Jovović (2014) analyses the outcomes of the performance evaluation by company size of businesses involved in non-life insurance business in Serbia during 2006-2013. According to Kaya (2015), total assets and profitability has a positive relationship at a statistically significant level of 1 percent based on research done on non-life insurance companies operating in Turkey.

Burca and Batrînca (2014) analysed the determinants of the financial performance and discovered a positive link between the size of the company and its financial performance on the Romanian insurance market during 2008–2012, supported by the Ethiopian insurance industry with a positive and statistically significant effect on profitability (Hailegebreal, 2016). According to Akhtar (2018), firm size was also discovered to have beneficial impacts on cost effectiveness in takaful insurers. He proposed that, due to the comparatively big amount of skills contributing to the results, the bigger companies are better positioned than smaller organizations to overcome operational improvements. In contrast, the research done in the assessment of multiple linear regression of general insurance underwriters in Kenya discovered, no relationship between size and financial performance (Iraya, 2014).

2.3.3 Expense Ratio (ETA)

ETA measurement of total asset expenditure also expressed as expense ratio will affect higher-ratio of financial performance. The combined ratio is the sum of the profit and expense ratio, and by reducing the expenses will increase the financial performance (Chen & Wong, 2004; Hirao & Inoue, 2004; Leverty & Grace, 2010). Murungi (2014) found in his research, the expense ratio had a significant connection with ROA. Supported by Pervan (2014) studies on the performance of insurance companies in Macedonia and panel analysis results on profitability determinants, it was also disclosed that the expense ratio has a statistically significant impact on the performance of insurers.

Pervan and Pavić Kramarić (2010) in the previous research of determinants of the profitability of Croatian non-life insurance businesses show that the expense ratio has an adverse and substantial impact on profitability. Research done by Akotey (2013) discovered the ability of an insurer to identify and invest in lucrative portfolios to boost investment revenue has a direct influence on the life insurance sector of Ghana over a period of eleven years 2000 to 2010 with a rise in expenditure on management activities which contributes to a decreasing effect on the general profitability of insurers.

2.4 Macroeconomic Factors

Macroeconomic factors known as external factor are related to the economic activities and business cycle of the country such as Gross Domestic Product (GDP), Based Lending Rate (BLR) and Treasury Bills Rate (TBR).The descriptions and past studies of each factor are reviewed in subsection 2.4.1, 2.4.2 and 2.4.3.

2.4.1 Gross Domestic Product (GDP)

GDP was identified as a significant contributing factor to the economic results of the insurance and takaful sector. In most studies, its models have also been used to evaluate revenue levels and GDP ratio is used to measure population to reflect income per capita. Real GDP / capita change is anticipated to have a beneficial impact on the economic results of insurers based on research done on Ethiopian nine (9) insurance firms prior to 2008 (Hailegebreal, 2016). This research supported by Burca and Batrînca (2014) on eight (8) insurance businesses in Tunisia over a span of eight (8) years from 2005-2012.

2.4.2 Based Lending Rate (BLR)

BLR increases will lead in standard bank deposits being adversely affected (Akhter 2015). In his six (6) year annual data 2006 to 2011 research on deposits of both conventional and Islamic banks in Pakistan, BLR considerably affects conventional bank deposits. As for Islamic bank deposits the base lending rate ratio has a negative sign and is important at the level of 1 percent.

Macroeconomic factors are important in determining deposit and financing in balance sheet of Islamic banks, namely deposit and financing as for Indonesia case from January 2004 to March 2011. Research conducted using information from Q1 2006 to Q4 2015 (Zainol, Nor, Ibrahim, & Daud, 2018), it is anticipated that BLR will have a significant connection to the macroeconomic factors in determining financial institutions performance in Malaysia.

2.4.3 Treasury Bills Rate (TBR)

According to Abdou (2014), Treasury Bill Rate (TBR) appears to be a factor influencing the development of the insurance industry in Malaysia from 2005 to 2010. Supported by Chang (1995); Rahman (2008) studies. TBR demonstrates an important factor for the takaful sector performance at a confidence level of 95 percent. However, based on statistical analysis TBR has no significant impact on the performance of the insurance sector in Malaysia.

Wuranjiya and Musa Simon (2019) discovered, a rise in short-term investment discount rate such as Treasury bill rate may lead investors to retain liquidity in the form of short-term investment rather than long-term investment such as shares. This situation will influence the share price of firms and reflect on the financial performance of the company.

2.5 Summary

Review on financial performance provides the holistic concept of this study. The differences mentioned from the reviews on firm specific and macroeconomic factors from the previous study shows evidence of the established relationship between these factors and financial performance. On the other hand, the theory consisting of Systems Theory and Resource Based View (RBV) explain how financial performance, firm specific and macroeconomic factors interrelated with one another.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

The purpose of this chapter is to highlight the methodology developed in identifying the determinants of financial performance of the Malaysia insurance companies and takaful operators. This chapter is prepared as follows: The first part begins with description or research design in section 3.1 that will be used to identify the relationship between firm specific factors (underwriting risk, size and expense ratio) and macroeconomic factors (GDP, BLR and TBR) to financial performance and followed by data collection procedures in section 3.2. It is continued by section 3.3 provide conceptual framework and 3.4 explain on operational definitions of the variables in the research framework. Section 3.5 are about hypothesis development and the hypothesis to be tested. Subsequently, section 3.6 and section 3.7 explains about the panel regression model and data analysis . The final part of this chapter section 3.8 tells a summary of the variables used in relation to the data source.

3.1 Research Design

This study examines the determinant of Malaysia insurance companies and takaful operators ' economic performance. The information used are secondary data from eight (8) insurance companies and eight (8) takaful operators in Malaysia from 2011 to 2018 referred to in Table 3.1, consisting of financial ratios which are the determinant of economic results. This study employed panel data regression using random effect and fixed effect model and was performed with STATA 14. The steps taken involved the following stages:

i. Extraction of economic information from insurance companies and takaful operators financial statements (balance sheets and income statements) and statistics report from Bank Negara Malaysia (BNM) for the period of 2011 to 2018.

ii. Compute the financial data into ratios as proxies for the dependent variable and three (3) firm specific factors. These variables were identified from the literature reviews related to the topic.

iii. In this study we also used macroeconomic factors such as Gross Domestic Product (GDP), Based Lending Rate (BLR) and Treasury Bills Rate (TBR).

iv. Finally, further analysis was done to see the differences of the financial performance determinants between insurance companies and takaful operators in Malaysia.

3.2 Data Collection Procedures

This study used secondary data. The sources of the data for analysing the macroeconomic factors over the period of 2011 – 2018 were obtained from statistics report by Bank Negara Malaysia (BNM). Meanwhile, for firm specific factors of this study, data which comprises of financial ratios were obtained from the financial statements (balance sheet and income statements) of insurance companies and takaful operators published in website over the period of 2011 – 2018 as per Table 3.1:

Table 3.1
List of insurance companies and takaful operators in Malaysia for this research:

Insurance companies	**Time Horizon**
1.AIA Berhad	2011 - 2017
2.Allianz Assurance Malaysia Berhad	2011 - 2017
3.AXA Affin Assurance Berhad	2011 - 2018
4.Etiqa Assurance Berhad	2011 - 2018
5.Great Eastern Life Assurance Berhad	2011 - 2018
6.Hong Leong Assurance Berhad	2011 - 2018
7.Prudential Assurance Malaysia Berhad	2011 - 2017
8.Sun Life Malaysia Assurance Berhad	2011 - 2017
Takaful operators	**Time Horizon**
1. AIA Public Takaful Berhad	2011 - 2017
2.Etiqa Takaful Berhad	2011 - 2018
3.Hong Leong MSIG Takaful Berhad	2011 - 2018
4.Prudential BSN Takaful Berhad	2011 - 2017
5.Sun Life Malaysia Takaful Berhad	2011 - 2017
6.Syarikat Takaful Malaysia Berhad	2011 - 2018
7.Takaful Ikhlas Berhad	2011 - 2018
8.Zurich Takaful Malaysia Berhad	2011 - 2017

Source: Bank Negara Malaysia (2019)

3.3 Conceptual Framework

Figure 3.1 shows the study's conceptual structure. Six (6) variables used as independent variable in insurance and takaful research. They are grouped into two. The first group comprises of three (3) firm specific factors that are: underwriting risk (NCR), size (LTA) and expense ratio (ETA). The second group contain macroeconomic factors. These variables are: GDP, BLR and TBR. The study's dependent variables are the financial performance represented by ROA and ROE.

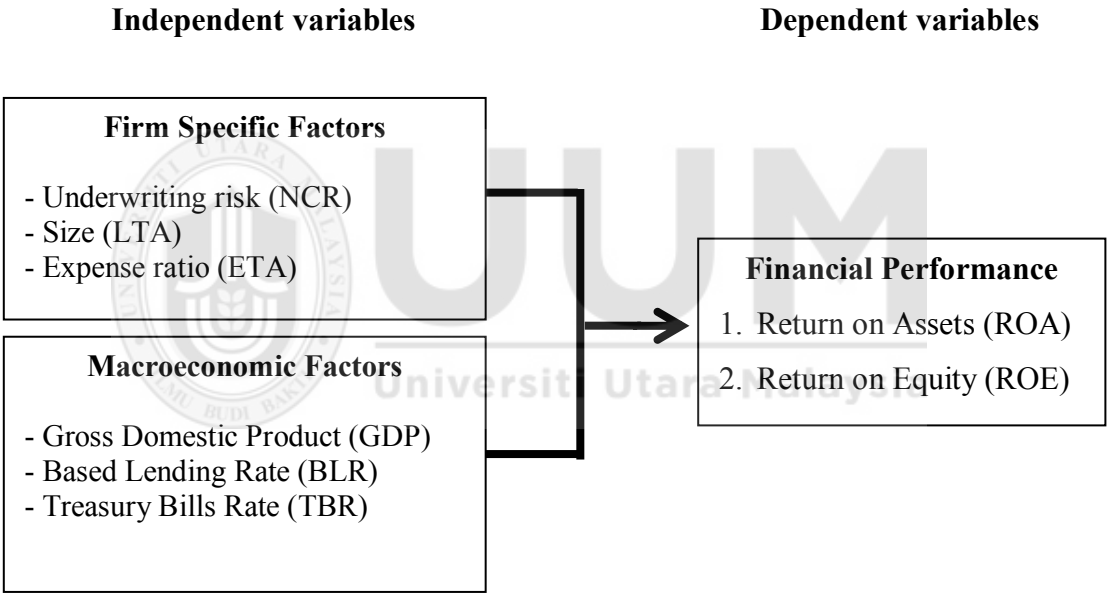


Figure 3.1
Conceptual Framework of the study

From the framework, the determinants of insurance companies' and takaful operators' financial performance can be measured from the following models:

$$\mathbf{ROA = \beta_0 + \beta_3 NCR + \beta_1 LTA + \beta_2 ETA + \beta_4 GDP + \beta_5 BLR + \beta_6 TBR + e_{it}}$$

$$\mathbf{ROE = \beta_0 + \beta_3 NCR + \beta_1 LTA + \beta_2 ETA + \beta_4 GDP + \beta_5 BLR + \beta_6 TBR + e_{it}}$$

3.4 Definition of variables

There are two (2) dependent variables which are ROA and ROE, three (3) firm specific factors and three (3) macroeconomic factors have been used in this study. The definition of each of the variables is explained in Table 3.2:

Table 3.2

Summary of Variables Used in the Study, the Measurement and Previous Researchers

Category	Variables	Measurement/ Ratio used	Authors
Dependent variables	Return on Assets (ROA)	Profit after tax / Total assets	Abdou (2014), Burca & Batrînca (2014), Datu (2016), Kemal (2018) and Guendouz & Ouassaf (2018)
	Return on Equity (ROE)	Profit after tax / Equity capital	Hidayat & Abdulla (2011), Afza & Jam (2012), Abdou (2014) and Akhtar (2017)
Independent variables	Underwriting risk (NCR)	Net claims incurred / Net contribution	Abdou (2014), Ana-Maria and Ghiorghe (2014), Hailegebreal (2016) and Datu (2016)
	Size (LTA)	Natural log of total assets	Ismail (2013), Ayele (2013), Tabari (2013), Wanjugu (2014), Lee (2014), Abdou (2014), Kaya (2015), Hailegebreal (2016) and Datu (2016)
	Expense Ratio (ETA)	Expenses / Total assets	Chen & Wong (2004), Hirao & Inoue (2004), Leverty & Grace (2010), Pervan & Pavić Kramarić (2010), Pervan (2014) and Murungi (2014)
	Gross Domestic Product (GDP)		Doumpos & Gaganis (2012), Lee (2014), Abdou (2014), Hailegebreal (2016)
	Based Lending Rate (BLR)		Akhter (2015) and (Zainol et al., 2018)
	Treasury Bills Rate (TBR)		Chang (1995), Rahman (2008), Abdou (2014), Wuranjiya & Musa and Simon (2019)

3.5 Hypothesis Development

The main purpose of this research is the identification of the key variables that have significant impact on financial performance, taken into account the influence of firm specific and macroeconomic factors. As a prelude to the hypothesis development, the following research questions are raised:

1) What is the level of financial performance between Insurance and Takaful industry in Malaysia over 2011-2018 study period?
2) Do underwriting risk, firm specific and macroeconomic factors affect the financial performances (ROA and ROE) of Malaysian insurance companies?
3) Do underwriting risk, firm specific and macroeconomic factors affect the financial performances (ROA and ROE) of Malaysian takaful operators?

This studies proposed six (6) hypotheses as follows;

H1: There is a positive relationship between financial performance and underwriting risk (NCR).

H2: There is positive relationship between financial performance and size (LTA).

H3: There is positive relationship between financial performance and expense ratio (ETA).

H4: There is positive relationship between financial performance and GDP.

H5: There is positive relationship between financial performance and BLR.

H6: There is positive relationship between financial performance and TBR.

3.6 Panel Regression Model

The regression models used in this study consist of dependent variable which is financial performance and the independent variables which effect will be tested comprises of both firm specific and macroeconomic factors. The coefficient estimates and their signs will denote the effect of the independent variables on financial performance. The regression equations for this study are as follows:

$$\mathbf{ROA = \beta_0\, it + \beta_3 NCR\, it + \beta_1 LTAit + \beta_2 ETAit + \beta_4 GDPit + \beta_5 BLRit + \beta_6 TBRit}$$

$$\mathbf{ROE = \beta_0\, it + \beta_3 NCR\, it + \beta_1 LTAit + \beta_2 ETAit + \beta_4 GDPit + \beta_5 BLRit + \beta_6 TBRit}$$

Where, β = Constant

i = Insurance / Takaful
t = Time period t

Dependent Variables:

ROA = Return on Assets
ROE = Return on Equity

Independent Variables:

NCR = Net claim incurred / net earned premiums or contributions
LTA = Natural log of total assets
ETA = Expenses / total assets
GDP = Gross Domestic Products
BLR = Based Lending Rate
TBR = Treasury Bills Rate

For a given value of an independent variable, the coefficient β allows the prediction of the resulting change in financial performance. The independent variables that explained the amount of variation is called the coefficient of determinants or adjusted R square (Adjusted R^2). This explains the percentage of variance explained by the independent variables.

3.7 Data Analysis

This section discusses about the data analysis technique to test the variables. The data analysis software that was used in this research is STATA 14. There were used in two stages; (1) diagnostic test and (2) panel data test. The diagnostic econometric tests before regressing the data for this study is explained in subsections 3.7.1. until 3.7.2.

3.7.1 Diagnostic Tests

The purpose of testing the quality of data variables is to strengthen the process of generalization of the data. There are five quality test such as; (1) detecting outliners using univariate, bivariate and multivariate techniques depending on the number of variables; (2) multicollinearity test to ensure the correlation between variables by using the tolerance value and variance inflation factor (VIF); (3) normality test to ensure that the data and variables are normally or not normally distributed; (4) heteroscedasticity test; and (5) auto-correlation test.

3.7.1.1 Detecting Outliners

Li et.al (2017) pointed out outliner detection approaches are based on notably different assumptions, intuitions, and models and also differ substantially in the scaling, range, and even meaning of values. Outliners detection principles, such as the k-distance of an object x, k-distance neighbourhood of an object, and reachability distance of an object x with respect to object o. The distance in k- distance of an object x is redefined as DTW (x, o) between x and an object such that (1) for at least k objects it holds that DTW(x, o) < DTW(x, o) and (2) for at most $k-1$ objects it holds that DTW(x, o) < DTW(x, o). k is a positive integer which always represents the number of objects and must be predetermined by experimentation.

3.7.1.2 Multicollinearity Test

Multicollinearity is a phenomenon to identify a correlation of two or more predictors (Daoud, 2017). A small different of multicollinearity will reflect a big impact especially when it is moderate or high resulting a problem that need to be solved. In this study, multicollinearity is checked using Variance Inflation Factor (VIF). Larger VIF value (> 8) denotes greater multi collinearity between the variables.

3.7.1.3 Normality Test

Normality test is to ensure that the data and variables are normally or not normally distributed. The normality tests are supplementary to the graphical assessment of normality. Oztuna et.al 2006 the main tests for the assessment of normality are Kolmogorov-Smirnov (K-S) test, Lilliefors corrected K-S test, Shapiro-Wilk test, Anderson-Darling test, Cramer-von Mises test, D'Agostino skewness test, Anscombe-Glynn kurtosis test, D'Agostino-Pearson omnibus test, and the Jarque-Bera test. Among these, K-S is a much used test and the K-S and Shapiro-Wilk tests can be conducted in the SPSS Explore procedure (Analyse → Descriptive Statistics → Explore → Plots → Normality plots with tests).

3.7.1.4 Heteroscedasticity Test

Heteroscedasticity is a common issue in linear regression modelling. Researchers need to reduce possible model misspecification of the explanatory part of the model when observing heteroscedasticity (e.g., considering alternative functional forms and/or omitted variables). In observational data, current contribution used another method of

heteroscedasticity which is directional misspecification, refers to a situation where alternative models are equally likely to identify the data generating process (e.g., x →y versus y →x). This resulting that the heteroscedasticity assumption is probably violated in models that erroneously treat true non normal predictors as response variables (Wiedermann , 2017).

3.7.1.5 Auto-Correlation Test

Yilmaz and Aktas (2017) suggested autocorrelation corrected standard errors for independent and correlated samples were introduced. The introduced methods were applied on plant trial data set and compared via a simulation study. The results show that, the empirical power is higher when the variances are equal for all the combinations of autocorrelation. When the sample size increases, the empirical power also increases. They used two sample comparison of two auto-correlated means which are; (1) Wilks approach; (2) Box-Hunter approach; (3) Seitshiro approach; and (4) The proposed approaches.

3.7.2 Panel Data Test

Since this study is using panel data, an analysis to select the most suitable panel data model for this study was conducted. Baltagi and Liu (2014) suggest random and fixed effects spatial two-stage least squares estimators for the generalized mixed regressive spatial autoregressive panel data model. Baltagi et al. (2013) generalized this random effects spatial model to encompass both cases and derived LM and LR tests to

distinguish between these models. The generalized model allows the individual effects and the remainder errors to have different spatial autoregressive parameters.

3.7.2.1 Fixed Effects Model

The Hausman test by Mutl and Pfaffermayr (2011) is based on the distinctions between this model's specification of fixed and random effects. It enables the interception of each insurance company and takaful operators to differ, but assuming the slope coefficients is continuous across businesses. General regression estimation as per below:

$$\mathbf{Y}it = \beta 1 + \beta 2\mathbf{X}2it + \beta 3\mathbf{X}3it + \mu it$$

Where

I = *i*th cross-sectional unit
t = tth time period

Fixed affects model estimation

$$\mathbf{Y}it = \beta 1i + \beta 2\mathbf{X}2it + \beta 3\mathbf{X}3it + \mu it$$

Where

i = intercept term

Gujarati and Porter (2007) stated that the subscript *i* on the intercept suggests that the intercepts of the individual insurance companies and takaful operators may be different.

They further explain that the differences could be due to the special features of each firm such as managerial style, policies or strategies.

Fixed effects model has its own (fixed) intercept ($\beta 1i$) value, whereas for random effects model, the intercept ($\beta 1$) represent the mean value of all the (cross-sectional) intercepts and the error component (εi) represents the (random) deviation of individual intercept from this mean value.

3.7.2.2 Random Effects Model

This approach treats intercept among individual differently from the fixed effects models. Instead of treating intercept ($\beta 1i$) as fixed, this approach assume that it is random variable with mean value of $\beta 1$ (without script i). the approach contends that the firms included as sample are drawing from a much larger universe of such banks and that they have a common mean value of the interception ($=\beta 1$) and the individual differences in the intercept value of each bank are reflected in the error term (εi) (Gujarati & Porter, 2007).

The estimation random effects model is as follows:

$$\mathbf{Y}it = \beta 1 + \beta 2\mathbf{X}2it + \beta 3\mathbf{X}3it + \mu it$$

$$= \beta 1 + \beta 2\mathbf{X}2it + \beta 3\mathbf{X}3it + \mathbf{W}it$$

Where

Wit = εi + μit

εi = cross-section or individual specific error component
μit = the combined time series and cross-section error component

For this study, random effects model is chosen for takaful operators. Meanwhile, as for insurance companies both models random effects and fixed affects model are chosen when null hypothesis of Hausman tests are rejected.

3.8 Summary

This chapter discusses the research design, hypothesis development, data collection and data analysis technique. The data used in this research is financial ratios from annual reports of the insurance companies and takaful operators in Malaysia which are published in the each firm website. The period of the study is eight (8) years from 2011 to 2018. The independent variables consist of three (3) firm specific (underwriting risk, size and expense ratio) and three (3) macroeconomic factors (GDP, TBR and BLR). The dependent variable is financial performance represented by ROA and ROE.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter discusses the results of this study. The sequence of discussion of this chapter started with descriptive statistics of the studied variables in Section 4.1, followed by 4.2 multicollinearity test, diagnostic test and financial performance analysis in Section 4.3 to 4.4. Subsequently, the results of the analysis inclusive of panel regression test of the direct relationship between financial performance and the firm specific and macroeconomic factors are presented and discussed in Section 4.5 to 4.6 respectively.

4.1 Descriptive Statistics

Table 4.1.1 presents the descriptive result of the variables for Malaysian insurance companies and Table 4.1.2 represent descriptive result of the variables for takaful operators.

Table 4.1.1
Descriptive Statistics of Variables for Insurance Companies in Malaysia.

Variables	Mean	Std. Deviation	Min	Max
ROA	0.0159	0.0221	-0.1173	0.0526
ROE	2.16	2.41	-0.0926	8.86
NCR	-0.9608	1.31	-10.60	1.31
LTA	22,094,216	22,291,932	177,590	81,206,366
ETA	0.0588	0.1038	0.0003	0.8056
GDP	5.21	0.5954	4.20	6
BLR	6.66	0.1405	6.45	6.9
TBR	3.03	0.2737	2.51	3.5

Table 4.1.1 shows a summary of descriptive statistics on each variable for insurance companies. It summarizes the mean, standard deviation, minimum value and maximum value for each variable. Mean is an indicator that shows the average for each variable.

The financial performance is proxy by ROA and ROE. Table 4.1.1 shows the range for ROA is between -0.1173 to 0.0526 while ROE is between -0.0926 to 8.86. The standard deviation for ROA is 0.0221 and ROE 2.41. The mean ROA is 0.0159 and ROE is 2.16. The range for firm specific starting with underwriting risk (NCR) is between -10.60 until 1.31. This contributes the mean for NCR is -0.9608 and standard deviation is 1.31. Mean for size (LTA) is 22,094,216 and the standard deviation is 22,291,932. The range for LTA is from 177,590 to 81,206,366. Expense ratio (ETA) with the minimum value of 0.0003 and maximum value is 0.8056. The mean for ETA is 0.0588 and the standard deviation is 0.1038. As for macroeconomic factors GDP has a minimum value of 4.2 and maximum value of 6 with the mean of 5.21 and standard deviation is 0.5954. Minimum value for BLR is range between 6.45 and 6.9 with mean and standard deviation is 6.66 and 0.1405 respectively. Finally the last variable for insurance companies is TBR with mean of 3.03 and standard deviation is 0.2737. Minimum value for TBR is 2.51 and maximum value is 3.5.

Table 4.1.2
Descriptive Statistics of Variables for Takaful Operators in Malaysia.

Variables	Mean	Std. Deviation	Min	Max
ROA	0.0191	0.0869	-0.0786	0.6605
ROE	0.3177	0.4402	-0.1366	1.99
NCR	-0.6012	0.4329	-2.39	1.56
LTA	3,599,624	4,217,948	121,393	16,340,281
ETA	0.1318	0.0868	0.0098	0.3603
GDP	5.21	0.5954	4.20	6
BLR	6.66	0.1405	6.45	6.9
TBR	3.03	0.2737	2.51	3.5

Table 4.1.2 shows a summary of descriptive statistics on each variable for takaful operators. Same as insurance companies, the financial performance is proxy by ROA and ROE. Table 4.1.2 shows the range for ROA is between -0.0786 to 0.6605 while ROE is between -0.1366 to 1.99. The standard deviation for ROA is 0.0869 and ROE 0.4402. The mean ROA is 0.0191 and ROE is 0.3177. The range for firm specific starting with underwriting risk (NCR) is between -2.39 until 1.56. This contributes the mean for NCR is -0.6012 and standard deviation is 0.4329. The mean for size (LTA) is 3,599,624 and the standard deviation is 4,217,948. The range for LTA is from 121,393 to 16,340,281. Expense ratio (ETA) with the minimum value of 0.0098 and maximum value is 0.3603. The mean for ETA is 0.1318 and the standard deviation is 0.0868. As for macroeconomic factors same as insurance companies with GDP has a minimum value of 4.2 and maximum value of 6 with the mean of 5.21 and standard deviation is 0.5954. Minimum value for BLR is range between 6.45 and 6.9 with mean and standard deviation is 6.66 and 0.1405 respectively. Finally the last variable for takaful operators

is TBR with mean of 3.03 and standard deviation is 0.2737. Minimum value for TBR is 2.51 and maximum value is 3.5.

4.2 Multicollinearity Test

In this study, to examine the existence of multicollinearity problem among the variables Variance Inflation Factor (VIF) is used. According to Pallant (2010) VIF value more than 9.0 should be taken as a warning of multicollinearity problem and the correlation matrix should be examined. The result of the test is presented in Table 4.2.1 for insurance companies and 4.2.2 for takaful operators.

Table 4.2.1
Multicollinearity Diagnostic Test for Insurance Companies Variables

Variables	VIF	Tolerance Value
LTA	1.56	0.6411
ETA	1.53	0.6551
BLR	1.11	0.9027
TBR	1.09	0.9151
GDP	1.08	0.9272
NCR	1.08	0.9295
Mean VIF	1.24	

Table 4.2.2
Multicollinearity Diagnostic Test for Takaful Operators Variables

Variables	VIF	Tolerance Value
LTA	1.63	0.6146
ETA	1.57	0.6366
BLR	1.14	0.8761
TBR	1.10	0.9104
NCR	1.08	0.9219
GDP	1.07	0.9312
Mean VIF	1.27	

Based on Table 4.2.1 and Table 4.2.2, there has been no evidence of multicollinearity problem exists in the model for insurance companies and takaful operators since the variables have VIF less than 9.0. The highest VIF among the variables is LTA which is 1.56 for insurance companies and 1.63 for takaful operators.

Table 4.2.3
Correlation Matrix for Insurance Companies

	ROA	ROE	LTA	ETA	NCR	GDP	BLR	TBR
ROA	1.0000							
ROE	0.0533	1.0000						
LTA	-0.0296	0.7918	1.0000					
ETA	-0.7623	-0.1963	-0.2684	1.0000				
NCR	0.1029	-0.0154	-0.0998	0.0263	1.0000			
GDP	-0.0765	-0.0414	-0.0261	0.1202	-0.1087	1.0000		
BLR	-0.0153	0.0951	0.1557	-0.0058	0.1765	-0.0437	1.0000	
TBR	0.0404	0.0334	0.0257	-0.0256	0.0286	0.1967	0.1979	1.0000

Table 4.2.4
Correlation Matrix for Takaful Operators

	ROA	ROE	LTA	ETA	NCR	GDP	BLR	TBR
ROA	1.0000							
ROE	0.6132	1.0000						
LTA	0.4387	0.6588	1.0000					
ETA	-0.1607	-0.2518	-0.5920	1.0000				
NCR	0.6746	0.4281	0.1068	0.1506	1.0000			
GDP	-0.1478	-0.1467	-0.0574	0.0691	-0.1324	1.0000		
BLR	0.2499	0.1906	0.2115	-0.1495	0.0269	-0.0437	1.0000	
TBR	0.1493	0.1214	0.0292	-0.0423	-0.0478	0.1967	0.1979	1.0000

Based on Table 4.2.3, the highest correlation for insurance companies is size (LTA) which is 0.7918 and as for Table 4.2.4, the highest correlation for takaful operators is underwriting risk (NCR) which is 0.6746. According to Pallant (2010), this value is below 0.9. Hence the correlation does not exceed the threshold of multicollinearity problem.

4.3 Diagnostic Test

The result of the heteroscedasticity test and auto-correlation test is conducted and the result is presented in Table 4.3 below:

Table 4.3
Diagnostic Test for Malaysian Insurance Company and Takaful Operators

Test	Insurance Company		Takaful Operators	
	ROA	ROE	ROA	ROE
	Prob > F			
Heteroscedasticity	0.0000***	0.0000***	0.0000***	0.0000***
Auto-correlation	0.0000***	0.1901	0.4354	0.6695

Note: *p<0.10,**p<0.05, ***p<0.01

4.3.1 Heteroscedasticity Test

The Breush-pagan test is used to detect the existence of heteroscedasticity problem in the model. The result in Table 4.3 shows Malaysian model is found to be significant at p<0.01. The result rejected the null hypothesis and concluded that heteroscedasticity presents in this model.

4.3.2 Auto-correlation Test

Gujarati and Porter (2010) suggested that a Lagrange-Multiplier test is most suitable for serial correlation and to detect first-order auto-correlation. Further, Wooldrige test for auto-correlation in panel data was used to detect serial or first-order auto-correlation problem. Hence, AR (1) is incorporated in the regression model to handle the auto-correlation problem in this study.

4.4 Financial Performance Analysis

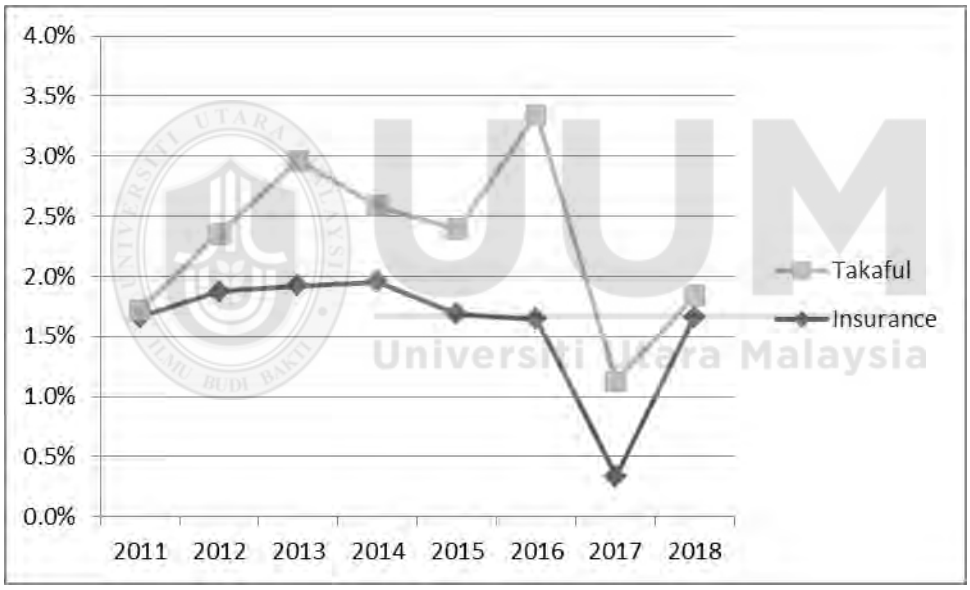


Figure 4.4.1
Level of financial performance (ROA) between Insurance and Takaful industry in Malaysia

Figure 4.4.1 presents the eight (8) years level of insurance companies and takaful operators financial performance (ROA) from 2011 to 2018. The results show that the level of financial performance (ROA) for insurance companies is increasing from 1.7 percent from 2011 but decreasing at 0.4 percent in year 2017 and increase again to 1.7 percent in 2018. However, as for takaful operators, there is tremendous increase from 1.7 percent in 2011 to 3.4 percent in 2016 and also decreasing in 2017 at 1.2 percent and this is due to split licensed based on BNM Financial Services Act (FSA) and Islamic Financial Services Act (IFSA) 2013 and slightly increase to 1.8 percent in 2018. This indicates that the takaful operators having better assets management compared to insurance companies.

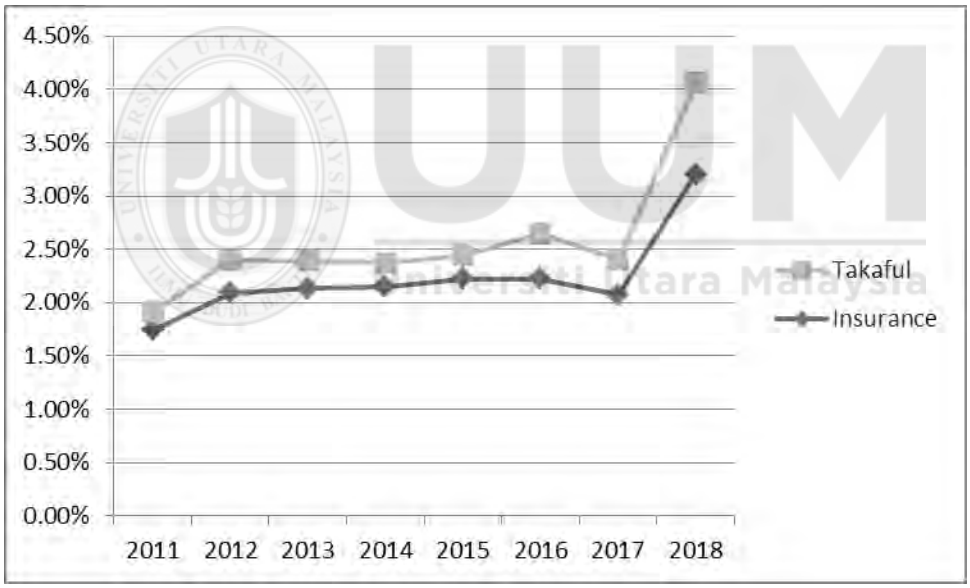


Figure 4.4.2
Level of financial performance (ROE) between Insurance and Takaful industry in Malaysia

Figure 4.4.2 presents the eight (8) years level of insurance companies and takaful operators financial performance (ROE) from 2011 to 2018. The results show that the level of financial performance (ROE) for insurance companies is increased from 1.7 percent to 3.2 percent from 2011 to 2018. In contrary with takaful operators, the level is highly increasing from 1.9 percent to 4.2 percent from 2011 to 2018. This indicates that takaful operators having better investment performance compared to insurance companies and it is strictly guided by *Shariah* practices.

4.5 Panel Regression Analysis for Insurance Companies and Takaful Operators

The panel regression analysis is performed using STATA 14 software to determine the projecting influence of independent variables (underwriting risk, size, and expense ratio, GDP, BLR and TBR) on dependent variable (ROA and ROE). In this study fixed effect model and random effect model have been used based on Hausman test. When heteroscedasticity and serial correlation is observed, estimation is done via panel random effects with cluster robust standard errors. The results of panel regression analysis for insurance companies are presented in the Table 4.5.1 and Table 4.5.2 while takaful operators are presented in the Table 4.5.3 and Table 4.5.4 respectively. The beta coefficient value (β) shows the contribution of each independent variable to the dependent variable.

Table 4.5.1
Firm Specific and Macroeconomic Factors on ROA of Insurance Companies

Variables	Beta Coefficient	p-value
NCR	0.0013	0.209
LTA	-0.0064	0.156
ETA	-0.1775	0.000***
GDP	-0.0004	0.749
BLR	0.0060	0.762
TBR	0.0033	0.454
Constant	0.0844	0.121
R-squared	0.5968	
Adjusted R-squared	0.4685	
N	60	

Note: *p<0.10,**p<0.05, ***p<0.01

Table 4.5.2
Firm Specific and Macroeconomic Factors on ROE of Insurance Companies

Variables	Beta Coefficient	p-value
NCR	0.0014	0.946
LTA	-0.8592	0.046**
ETA	-2.0805	0.070*
GDP	-0.1791	0.074*
BLR	2.2643	0.024 **
TBR	0.1243	0.669
Constant	1.702234	0.830
R-squared	0.4605	
Adjusted R-squared	0.5293	
N	60	

Note: *p<0.10,**p<0.05, ***p<0.01

The result of the multiple regressions for insurance companies is presented in Table 4.5.1 for ROA and Table 4.5.2 for ROE. The R-squared for ROA is 0.5968 shows that regression model consisting of underwriting risk (NCR), size (LTA), expense ratio (ETA), GDP, BLR and TBR could explain 59.68 percent changes in ROA. Meanwhile, R-squared for ROE 0.4605 explains 46.05 percent changes in ROE. The predictors from macroeconomic factors, such as GDP and BLR which are having statistically significant impact on ROE but none on ROA of insurance companies. Meanwhile, as for firm specific factors, size (LTA) is found significant to ROE while expense ratio (ETA) is found to be significant to ROA and ROE which are having statistically significant impact on financial performance of insurance companies and supporting the hypotheses. Details of the result are presented in Appendix IV.

Table 4.5.3
Firm Specific and Macroeconomic Factors on ROA of Takaful Operators

Variables	Beta Coefficient	p-value
NCR	0.1396	0.066*
LTA	0.0101	0.054*
ETA	-0.1386	0.294
GDP	-0.0098	0.000***
BLR	0.0852	0.123
TBR	0.0527	0.061*
Constant	-0.7003	0.119
R-squared	0.6014	
Adjusted R-squared	0.4584	
N	60	

Note: *p<0.10,**p<0.05, ***p<0.01

Table 4.5.4
Firm Specific and Macroeconomic Factors on ROE of Takaful Operators

Variables	Beta Coefficient	p-value
NCR	0.3414	0.014**
LTA	0.1564	0.003***
ETA	-0.0261	0.966
GDP	-0.0804	0.004***
BLR	0.0652	0.804
TBR	0.2543	0.007***
Constant	-2.5139	0.175
R-squared	0.5984	
Adjusted R-squared	0.7469	
N	60	

Note: *p<0.10,**p<0.05, ***p<0.01

The result of the multiple regressions for takaful operators is presented in Table 4.5.3 for ROA and Table 4.5.4 for ROE. The R-squared for ROA 0.6014 shows that regression model consisting of underwriting risk (NCR), size (LTA), expense ratio (ETA), GDP, BLR and TBR could explain 60.14 percent changes in ROA. Meanwhile R-squared for ROE 0.5984 explains 59.84 percent changes in ROE. Furthermore, the predictors from macroeconomic factors, such as, GDP and TBR which are having statistically significant impact on ROA and ROE of takaful operators and supporting the hypotheses. Meanwhile there are two (2) predictors from firm specific factors which are found to be significant that is, underwriting risk (NCR) and size (LTA) which are having statistically significant impact on financial performance of takaful operators and supporting the hypotheses. However, the expense ratio (ETA) and BLR have no impact on financial performance of takaful operators which is not supporting the hypotheses. Details of the result are presented in Appendix IV.

4.6 Summary of the Results

To summarize the results regarding the hypotheses related to the predictive of firm specific and macroeconomic factors towards the financial performance of insurance companies and takaful operators the predictor coefficient test regression presented in Table 4.6.1 and Table 4.6.2.

Table 4.6.1
Summary of Multiple Regression Result of Firm Specific and Macroeconomic Factors on Insurance Companies

Variables	Expected Sign	ROA	ROE
NCR	+	Insignificant (+)	Insignificant (+)
LTA	+	Insignificant (-)	Significant (-)
ETA	+	Significant (-)	Significant (-)
GDP	+	Insignificant (-)	Significant (-)
BLR	+	Insignificant (+)	Significant (+)
TBR	+	Insignificant (+)	Insignificant (+)

Table 4.6.2
Summary of Multiple Regression Result of Firm Specific and Macroeconomic Factors on Takaful Operators

Variables	Expected Sign	ROA	ROE
NCR	+	Significant (+)	Significant (+)
LTA	+	Significant (+)	Significant (+)
ETA	+	Insignificant (-)	Insignificant (-)
GDP	+	Significant (-)	Significant (-)
BLR	+	Insignificant (+)	Insignificant (+)
TBR	+	Significant (+)	Significant (+)

Table 4.6.3 summarizes the results from the analysis of firm specific and macroeconomic factors for insurance companies and takaful operators in Malaysia over 2011 to 2018. Based on the results, four (4) variables are significant for insurance companies are size (LTA), expense ratio (ETA), GDP and BLR. Meanwhile, as for takaful operators four (4) significant variables which are size (LTA), underwriting risk (NCR), GDP and TBR.

Table 4.6.3
Summary of Results Based on Hypothesis

Variables	Hypothesized Relationship	ROA	ROE	ROA	ROE
		Insurance Companies		Takaful Operators	
NCR	+	Insignificant (+)	Insignificant (+)	Significant (+)	Significant (+)
LTA	+	Insignificant (-)	Significant (-)	Significant (+)	Significant (+)
ETA	+	Significant (-)	Significant (-)	Insignificant (-)	Insignificant (-)
GDP	+	Insignificant (-)	Significant (-)	Significant (-)	Significant (-)
BLR	+	Insignificant (+)	Significant (+)	Insignificant (+)	Insignificant (+)
TBR	+	Insignificant (+)	Insignificant (+)	Significant (+)	Significant (+)

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 Introduction

This study aims to measure the effects of firm specific and macroeconomic factors on insurance companies and takaful operators financial performance with ROA and ROE variables is taken as dependent variables over the 8 years period from 2011 to 2018. The insurance companies consist of eight (8) companies and eight (8) takaful operators. This chapter presents the major findings of the study based on research objectives in section 5.1. Section 5.2 highlights the contribution of the study. Meanwhile, section 5.3 and 5.4 is limitation of the study and suggestion areas for future research respectively.

5.1 Recapitulation of findings

To recapitulate the findings of three research objectives are presented based on the sequence as follows:

5.1.1 Objective one

The study's first goal is to analyse the level in Malaysia's performance of insurance companies and takaful operators. The findings show the level of eight (8) years of insurance companies and takaful operators from 2011 to 2018 in Malaysia. The results show that the financial performance ROA of insurance companies is increasing at 1.7 percent in 2011 but decreasing at 0.4 percent in 2017 and increase again to 1.7 percent in 2018. As for takaful operators performance level increased from 1.7 percent in 2011 to

3.4 percent in 2016 but decreasing in 2017 at 1.2 percent. While as for financial performance ROE, insurance companies had an increased from 1.7 percent to 3.2 percent. However, as for takaful operators the level of financial performance is tremendous increased from 1.9 percent to 4.2 percent from 2011 to 2018. This indicates that takaful operators have better assets management and investment performance guided with *Shariah* practices.

5.1.2 Objective Two

Objective two of the study is to investigate the impact of underwriting, firm specific and macroeconomic factors on the performance of insurance companies in Malaysia. The result is presented in (Table 4.5.1 and Table 4.5.2). The results show that there is a negative and significant relationship between size and financial performance, which appears to suggest that when size increases subsequently financial performance will increase. The results also show the coefficient estimation result of expense ratio is negatively and significantly related to insurance companies in Malaysia. The result indicated that expense ratio is a significant at 7 percent and increase of expense ratio will reduce financial performance.

5.1.3 Objective Three

Objective three of the study is to investigate the impact of underwriting, firm specific and macroeconomic factors on the performance of takaful operators. In Table 4.5.3 and Table 4.5.4, the results are provided. The p-value of size for ROA is 0.054 and 0.003 for ROE ($p<0.1$). The result shows that there is a positive and significant relationship

between size and financial performance, which appears to suggest that the increasing of size in tandem with increase of financial performance. The results also show the coefficient estimation result of underwriting risk is positively and significantly related to takaful operators in Malaysia. The result indicated that underwriting risk is a significant at 6.6 percent ROA and 1.4 percent ROE.

The uniqueness of characteristics in Takaful operators underwriting and pricing practices that differentiate with the conventional insurance system, as described by Ali (1989) and Kwon (2007). In addition, several clauses such as suicidal clauses and policy loans in conventional insurance are not applicable and modified in the takaful system. Different business approaches has been implemented to realize the vision.

However, due to insufficient fund, the takaful operators are vulnerable to a non-negligible risk that leads to inability to recuperate a *Qard Hasan*. Furthermore, due to intrinsic principles of Islamic finance an outstanding loan cannot be imposed any charges as compared to insurance companies' practices (Jaffer, Ismail, Noor & Unwin, 2010).

5.2 Contribution of the Study

This research focuses on the economic performance of Malaysian insurance companies and takaful operators. As for insurance industry, there are extensively past studies on financial performance. The literature review also demonstrates that not many have been

studying the comparison between insurance companies and takaful operators. This research therefore contributes in the following ways:

It has widened the scope of analysis on financial performance of insurance companies and takaful operators based on firm specific and macroeconomic factors. Therefore, this study contributes new findings in terms of the influence of firm specific factors such as underwriting risk (NCR) and expense ratio (ETA) and macroeconomic factors such as BLR and TBR. Expense ratio (ETA) and BLR are found to be significant to insurance companies. Meanwhile underwriting risk (NCR) and TBR are positively significant to takaful operators. This finding will add new knowledge to the existing insurance and takaful industry literature in Malaysia.

The comparison between insurance companies and takaful operators also highlight significant differences. Based on the results, four (4) variables are significant for insurance companies which are size (LTA), expense ratio (ETA), GDP and BLR. Meanwhile, as for takaful operators, four (4) variables are significant which are underwriting risk (NCR), size (LTA), GDP and TBR.

5.3 Limitation of the Study

There are some limitations that need to be taken into account in this study. First, only eight (8) insurance companies and eight (8) takaful operators in Malaysia were examined in this study. The findings of this research are therefore restricted to a small number of insurance and takaful industries in Malaysia and do not represent the

economic performance of the insurance and takaful sector in other areas of the world. Second, the results established are limited to published accounts for 2011 to 2018 study periods only. Third, the limited of literature review on financial performance of takaful operators remain a problem to support the variables of the study and findings.

5.4 Suggestion for Future Research

Pursuant to the present study, several inputs for future research to be undertaken are suggested as follows:

First, financial performance of insurance and takaful industry is an essential role in contributing to the Malaysia economics. However, there are very limited empirical studies which can be found. Thus, it is suggested that more research to be conducted to identify the determinants of insurance and takaful industry financial performance. The topics should not be limited to several firm specific and macroeconomic factors only but also identify other related areas in depth such as global factors, Islamic perspective and legal implication.

Second, in order to obtain more comprehensive analysis of the financial performance of insurance and takaful industry, a comparative study between countries or region which implementing both insurance and takaful system is necessary. Thus, it is recommended that an individual country from Middle East and North Africa (MENA) countries study

is to be conducted for the purpose of comparing the results between them in order to detect country specifics.

Third, some new statistical software could be used in future studies to uncover further insights into the various operational and strategic aspects of insurance companies and takaful operators.

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APPENDIX I

1. Sum - Insurance Companies

Variable	Obs	Mean	Std. Dev.	Min	Max
co	0				
code	60	4.55	2.295353	1	8
year	60	2014.267	2.192952	2011	2018
roa	60	.0158767	.022131	-.1173	.0526
roe	60	2.162997	2.405511	-.0926	8.8574
ta	60	2.21e+07	2.23e+07	177590	8.12e+07
iir	60	.201005	.1016737	.0261	.4165
ncr	60	-.960775	1.310303	-10.6012	1.3107
solr	60	7.409043	6.304028	.3803	37.7217
lvg	60	.8918067	1.005465	.0017	8.2289
mge	60	689625.6	652188.1	3036	2036684
eta	60	.0588467	.1037831	.0003	.8056
sp	60	.0156633	.0257997	-.1244	.0682
cpi	60	2.477333	.7926396	1	3.7
gdp	60	5.206667	.5954252	4.2	6
blr	60	6.658667	.1404528	6.45	6.9
tbr	60	3.034933	.2736987	2.512	3.501

2. Sum- Takaful Operators

Variable	Obs	Mean	Std. Dev.	Min	Max
co	0				
code	60	4.533333	2.310379	1	8
year	60	2014.267	2.192952	2011	2018
roa	60	.019125	.0868978	-.0786	.6605
roe	60	.3177217	.4401864	-.1366	1.9999
ta	60	3599624	4217948	121393	1.63e+07
iir	60	.1351817	.1817711	.0052	.9938
ncr	60	-.6012083	.4329279	-2.3887	1.5636
solr	60	5.674823	7.797102	1.0941	61.01
lvg	60	.8227283	.1429471	.0803	.9293
mge	60	261308	190180.6	21899	679848
eta	60	.13178	.0867711	.0098	.3603
sp	60	.0128583	.0247345	-.0905	.0809
cpi	60	2.477333	.7926396	1	3.7
gdp	60	5.206667	.5954252	4.2	6
blr	60	6.658667	.1404528	6.45	6.9
tbr	60	3.034933	.2736987	2.512	3.501

APPENDIX II

1. VIF- Insurance Companies

Variable	VIF	1/VIF
lta	1.56	0.641065
eta	1.53	0.655069
blr	1.11	0.902743
tbr	1.09	0.915138
gdp	1.08	0.927174
ncr	1.08	0.929532
Mean VIF	1.24	

2. VIF- Takaful Operators

Variable	VIF	1/VIF
lta	1.63	0.614564
eta	1.57	0.636554
blr	1.14	0.876064
tbr	1.10	0.910376
ncr	1.08	0.921891
gdp	1.07	0.931219
Mean VIF	1.27	

APPENDIX III

1. Correlation- Insurance Companies

```
. corr roa roe ta iir ncr solr lvg mge eta sp cpi gdp blr tbr(obs=60)
```

	roa	roe	ta	iir	ncr	solr	lvg	mge
roa	1.0000							
roe	0.0533	1.0000						
ta	-0.0296	0.7918	1.0000					
iir	0.0195	0.6197	0.7379	1.0000				
ncr	0.1029	-0.0154	-0.0998	-0.1676	1.0000			
solr	0.1420	0.2167	0.2152	0.1660	0.0754	1.0000		
lvg	-0.7874	-0.0156	-0.0188	0.0357	-0.0364	-0.0772	1.0000	
mge	0.0031	0.7978	0.7780	0.5112	-0.1091	0.0669	0.0590	1.0000
eta	-0.7623	-0.1963	-0.2684	-0.2010	0.0263	-0.2401	0.9351	-0.1321
sp	0.9039	0.0784	0.0266	0.0856	0.0392	-0.0101	-0.6354	0.1508
cpi	-0.1296	-0.0819	-0.0112	-0.0845	0.0632	0.0090	0.1782	-0.0420
gdp	-0.0765	-0.0414	-0.0261	0.0099	-0.1087	-0.0765	0.1400	-0.0695
blr	-0.0153	0.0951	0.1557	-0.0220	0.1765	0.0654	0.0240	0.1463
tbr	0.0404	0.0334	0.0257	0.1091	0.0286	0.0427	-0.0172	0.0166

2. Correlation- Takaful Operators

```
. corr roa roe ta iir ncr solr lvg mge eta sp cpi gdp blr tbr(obs=60)
```

	roa	roe	ta	iir	ncr	solr	lvg	mge
roa	1.0000							
roe	0.6132	1.0000						
ta	0.4387	0.6588	1.0000					
iir	0.2473	0.1734	0.2985	1.0000				
ncr	0.6746	0.4281	0.1068	0.0589	1.0000			
solr	0.0928	-0.0102	0.1876	0.1062	-0.0468	1.0000		
lvg	0.1125	0.2884	0.2370	0.1232	0.0128	-0.6287	1.0000	
mge	0.3472	0.7331	0.6955	0.0344	0.2592	-0.1474	0.4339	1.0000
eta	-0.1607	-0.2518	-0.5920	-0.3596	0.1506	-0.4049	-0.0125	-0.0608
sp	0.3160	0.5440	0.2687	0.1035	0.1757	-0.0306	0.4462	0.4431
cpi	-0.2636	-0.2055	-0.0890	0.0428	-0.2609	-0.0023	0.0456	-0.0725
gdp	-0.1478	-0.1467	-0.0574	-0.0619	-0.1324	0.0164	0.0062	-0.0642
blr	0.2499	0.1906	0.2115	0.1937	0.0269	0.1229	0.1230	0.2302
tbr	0.1493	0.1214	0.0292	0.0519	-0.0478	-0.1828	0.1791	0.0262

APPENDIX IV

1. ROA(robust)- Insurance Companies

```
. xtreg roa lta eta ncr gdp blr tbr,re vce (robust)

Random-effects GLS regression                   Number of obs     =         60
Group variable: code                            Number of groups  =          8

R-sq:                                           Obs per group:
     within  = 0.7642                                         min =          7
     between = 0.4685                                         avg =        7.5
     overall = 0.5968                                         max =          8

                                                Wald chi2(6)      =  694711.44
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

                                  (Std. Err. adjusted for 8 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         roa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lta |  -.0064308   .0045345    -1.42   0.156    -.0153182    .0024566
         eta |  -.1774996   .0094521   -18.78   0.000    -.1960254   -.1589738
         ncr |   .0012771   .0010168     1.26   0.209    -.0007158      .00327
         gdp |   -.000402   .0012585    -0.32   0.749    -.0028686    .0020646
         blr |   .0060165   .0198893     0.30   0.762    -.0329659    .0449988
         tbr |   .0032801   .0043825     0.75   0.454    -.0053095    .0118697
       _cons |   .0843855   .0543689     1.55   0.121    -.0221756    .1909466
-------------+----------------------------------------------------------------
     sigma_u |  .01221785
     sigma_e |   .00834304
         rho |   .68199176   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

APPENDIX IV (Continue)

2. ROA (robust)- Takaful Operators

```
.  xtreg roa lta eta ncr gdp blr tbr, re vce (robust)

Random-effects GLS regression                   Number of obs     =         60
Group variable: code                            Number of groups  =          8

R-sq:                                           Obs per group:
     within  = 0.6297                                         min =          7
     between = 0.4584                                         avg =        7.5
     overall = 0.6014                                         max =          8

                                                Wald chi2(6)      =      59.89
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

                                    (Std. Err. adjusted for 8 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         roa |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lta |   .0100929   .0052368     1.93   0.054    -.0001712    .0203569
         eta |  -.1385571   .1319049    -1.05   0.294    -.3970859    .1199718
         ncr |   .1395576   .0758412     1.84   0.066    -.0090883    .2882036
         gdp |  -.0097619   .0025074    -3.89   0.000    -.0146763   -.0048475
         blr |   .0852047    .055298     1.54   0.123    -.0231774    .1935869
         tbr |   .0526793   .0281108     1.87   0.061    -.0024169    .1077756
       _cons |  -.7002913   .4491416    -1.56   0.119    -1.580593    .1800102
-------------+----------------------------------------------------------------
     sigma_u |  .01921157
     sigma_e |  .05461248
         rho |  .11012162   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

APPENDIX IV (Continue)

1. ROE (robust)- Insurance Companies

```
. xtreg roe lta eta ncr gdp blr tbr, fe vce (robust)

Fixed-effects (within) regression               Number of obs     =         60
Group variable: code                            Number of groups  =          8

R-sq:                                           Obs per group:
     within  = 0.1988                                         min =          7
     between = 0.5293                                         avg =        7.5
     overall = 0.4605                                         max =          8

                                                F(6,7)            =       3.36
corr(u_i, Xb)  = -0.8514                        Prob > F          =     0.0692

                                    (Std. Err. adjusted for 8 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         roe |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lta |  -.8591673   .3547041    -2.42   0.046    -1.697909   -.0204253
         eta |  -2.080503   .9722385    -2.14   0.070    -4.379482    .2184752
         ncr |    .001374   .0196586     0.07   0.946    -.0451111    .0478591
         gdp |  -.1790521   .0854079    -2.10   0.074    -.3810097    .0229056
         blr |   2.264268   .7888956     2.87   0.024     .3988267     4.12971
         tbr |   .1242969   .2781976     0.45   0.669    -.5335359    .7821297
       _cons |   1.702234   7.636982     0.22   0.830    -16.35636    19.76083
-------------+----------------------------------------------------------------
     sigma_u |  3.3827926
     sigma_e |  .55873267
         rho |  .97344366   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

APPENDIX IV (Continue)

2. ROE (robust) - Takaful Operators

```
. xtreg roe lta eta ncr gdp blr tbr,re vce (robust)

Random-effects GLS regression                   Number of obs     =         60
Group variable: code                            Number of groups  =          8

R-sq:                                           Obs per group:
     within  = 0.4191                                         min =          7
     between = 0.7469                                         avg =        7.5
     overall = 0.5984                                         max =          8

                                                Wald chi2(6)      =      89.03
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000

                                    (Std. Err. adjusted for 8 clusters in code)
------------------------------------------------------------------------------
             |               Robust
         roe |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         lta |   .1564323   .0517917     3.02   0.003     .0549225    .2579422
         eta |  -.0260513   .6078571    -0.04   0.966    -1.217429    1.165327
         ncr |   .3414369   .1395826     2.45   0.014       .06786    .6150138
         gdp |  -.0803963   .0278195    -2.89   0.004    -.1349216    -.025871
         blr |   .0652215   .2631115     0.25   0.804    -.4504675    .5809105
         tbr |   .2543249   .0942684     2.70   0.007     .0695621    .4390876
       _cons |  -2.513933   1.853121    -1.36   0.175    -6.145984    1.118118
-------------+----------------------------------------------------------------
     sigma_u |  .20930591
     sigma_e |  .21818278
         rho |  .47924379   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```